IN THE CLAIMS:

1. (Currently Amended) A method of spectral analysis of a radio frequency ultrasonic signal returned from a structure subjected to an ultrasound examination, comprising the phases of:

a) transmitting an ultrasonic excitation signal to a portion of said structure subjected to examination;

b) receiving a radio frequency response signal from said structure;

c) applying a sequence of filtering operations to obtain decomposition of the band of the radio frequency response signal into a plurality of frequency bands;

d) from the coefficients resulting from said filtering operation, calculating local estimators ~~(a_{ij}, c_{ij})~~, containing information on the spectrum of the radio frequency signal,[[;]] ~~characterized in that~~ wherein said local estimators ~~(a_{ij}, c_{ij})~~ are combined with parameters [[(σ_{ij})]] representative of the shape of a statistical distribution of said local estimators into a portion of an ultrasound image.

2. (Currently Amended) A method ~~Method~~ as claimed in claim 1, wherein the frequency bands into which said radio frequency signal is subdivided cover the entire frequency band of the signal.

3. (Currently Amended) A method ~~Method~~ as claimed in claim 1, wherein said frequency bands are bands of different width and position.

4. (Currently Amended) A method ~~Method~~ as claimed in claim 1, comprising the phases of:

- for an ultrasound input frame, producing a sampled and digitized frame;
- decomposing said sampled and digitized frame into said frequency bands;
- producing a matrix of spectral coefficients containing the coefficients resulting from said filtering operation or coefficients deriving therefrom;
- determining, for at least some of the points of the sampled and digitized frame, respective interpolating polynomials [[(PI)]] which approximate the variation of said spectral coefficients in the various bands into which the radio frequency signal was decomposed;
- for said points, obtaining said local estimators ~~(a_{ij}, c_{ij})~~ from at least one of the coefficients ~~$(a_o, \ldots a_k)$~~ of the interpolating polynomial, said local estimators constituting a matrix of local estimators.

5. (Currently Amended) A method ~~Method~~ as claimed in claim 4, wherein each of said local estimators [[(a_{ij})]] is constituted by one of the coefficients of the respective interpolating polynomial.

6. (Currently Amended) A method ~~Method~~ as claimed in claim 4, wherein at least two local estimators ~~$(a_{ij}^{(k)})$~~ are determined for each point on the basis of at least two coefficients of the interpolating polynomial, to produce a three-dimensional matrix of local estimators ~~$(a_{ij}^{(k)})$~~.

7. (Currently Amended) A method ~~Method~~ as claimed in claim 4, wherein each of said local estimators [[(c_{ij})]] is constituted by a combination of a plurality of coefficients of the corresponding interpolating polynomial.

8. (Currently Amended) A method ~~Method~~ as claimed in claim 4, wherein each of said local estimators ~~(a_{ij}; c_{ij})~~ is combined with a shape coefficient [[(σ_{ij})]] of a distribution histogram of said local estimators in a window inside which said local estimator is contained, to obtain a weighted local estimator [[(b_{ij})]].

9. (Currently Amended) A method ~~Method~~ as claimed in claim 8, comprising the phases of:

- determining a statistical distribution of said local estimators ~~(a_{ij}, c_{ij})~~ in windows with dimensions smaller than the dimension of said matrix of local estimators ~~(a_{ij}; c_{ij})~~;
- determining a shape parameter [[(σ_{ij})]] characteristic of said statistical distribution for each of said windows;
- for each window, combining said shape parameter [[(σ_{ij})]] with a corresponding local estimator ~~(a_{ij}; c_{ij})~~ to obtain a weighted local estimator [[(b_{ij})]].

10. (Currently Amended) A method ~~Method~~ as claimed in claim 4, wherein several weighted local estimators obtained for the same point of the sampled and digitized ultrasound

frame using different coefficients ~~(a_o,...a_k)~~ of the respective interpolating polynomial are combined with one another.

11. (Currently Amended) A method ~~Method~~ as claimed in claim 1, wherein said filtering operations are obtained using a time-frequency transform.

12. (Currently Amended) A method ~~Method~~ as claimed in claim 11, wherein said time-frequency transform is a wavelet.

13. (Currently Amended) A method ~~Method~~ as claimed in claim 11, wherein said time-frequency transform is a Discrete Wavelet Packet Transform ~~(DWPT)~~.

14. (Currently Amended) A method ~~Method~~ as claimed in claim 1, comprising the phase to determine statistical distribution of the weighted local estimators and to create a set of classes of values capable of bi-univocally identifying homogeneous portions on the ultrasound frame of the investigated sample.

15. (Currently Amended) A method ~~Method~~ as claimed in claim 1, wherein color images produced using said weighted local estimators are overlaid on an ultrasound image.

16. (Currently Amended) A method ~~Method~~ as claimed in claim 15, wherein said color

images are produced selecting the weighted local estimators that fall within classes of reference, bi-univocally related to predetermined tissue structures.

17. (Currently Amended) A method of spectral analysis of a radio frequency ultrasonic signal returned from a structure subjected to an ultrasound examination, comprising the phases of:

a) transmitting an ultrasonic excitation signal to a portion of said structure subjected to examination;

b) receiving an input radio frequency response signal from said structure;

c) for an input ultrasound frame, producing a sampled and digitized frame;

d) applying a filtering sequence to said sampled and digitized frame to obtain decomposition of the band of the radio frequency response signal into a plurality of frequency bands;

e) producing a matrix of spectral coefficients containing the coefficients resulting from said filtering operation or coefficients deriving therefrom;

f) determining, for at least some of the points of the sampled and digitized frame, respective interpolating polynomials [[(PI)]] which approximate the variation of said spectral coefficients in the various bands into which the radio frequency signal was decomposed;

g) for said points, from the coefficients $\cancel{(a_o,...a_k)}$ of the interpolating polynomial obtaining a local estimator [[(c_{ij})]], combining at least two coefficients of

different orders ~~(a_o,...a_k)~~ of the interpolating polynomial with one another.

18. (Currently Amended) A method ~~Method~~ as claimed in claim 17, wherein the frequency bands into which said radio frequency signal is subdivided cover the entire frequency band of the signal.

19. (Currently Amended) A method ~~Method~~ as claimed in claim 17, wherein said frequency bands are bands of different width and position.

20. (Currently Amended) A method ~~Method~~ as claimed in claim 17, wherein said filtering operations are obtained using a time-frequency transform.

21. (Currently Amended) A method ~~Method~~ as claimed in claim 20, wherein said time-frequency transform is a wavelet.

22. (Currently Amended) A method ~~Method~~ as claimed in claim 20, wherein said time frequency transform is a Discrete Wavelet Packet Transform ~~(DWPT)~~.

23. (Currently Amended) A method ~~Method~~ as claimed in claim 17, comprising the phase to determine statistical distribution of the local estimators and to create a set of classes of values capable of bi-univocally identifying homogeneous portions on the ultrasound frame

of the investigated sample.

24. (Currently Amended) A method ~~Method~~ as claimed in claim 17, wherein color images produced using said local estimators are overlaid on an ultrasound image.

25. (Currently Amended) A method ~~Method~~ as claimed in claim 24, wherein said color images are produced selecting the local estimators that fall within classes of reference, bi-univocally related to predetermined tissue structures.

26. (Previously Presented) An ultrasound device comprising an ultrasound probe, means to acquire and process a radio frequency return signal from a structure subjected to ultrasound examination, characterized in that said acquisition and processing means are programmed to carry out a method as claimed in claim 1.